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ABSTRACT

A recent unpublished study by B. Griesemer (1995) studied the relationship between motivation and self-efficacy for learning among 146 sixth graders. Griesemer used two instruments in that study: one to measure intrinsic versus extrinsic motivation composed of three subscales from the Scale of Intrinsic versus Extrinsic Orientation in the Classroom by S. Harter (1980) and the other a subscale measuring self-efficacy for self-regulated learning developed, but not published, by A. Bandura. Results of Griesemer's original study were inconclusive, and she hypothesized that the two instruments may have been measuring aspects of the same construct. The present study is a followup examination of data from the original study. Reliability and factorial validity were studied for both instruments, and subscale intercorrelations were determined. Results support the idea that the scales do measure aspects of the same underlying constructs. Both instruments may be assessing the connection between classroom self-efficacy and learning self-regulation from different perspectives. An appendix presents the unpublished instrument developed by Bandura. (Contains seven tables and seven references.) (SLD)

Relationships Between Harter's Scale of Intrinsic Versus Extrinsic Orientation and Bandura's Scale of Self-efficacy for Self-regulated Learning

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Introduction

In a recent unpublished study by Griesemer (1995) the relationship between motivation and self-efficacy for self-regulated learning was examined using 146 sixth grade subjects. The purpose of this study was to ascertain whether self-efficacy for self-regulated learning might mediate the shifts in motivational level that were previously reported in a study by Harter, Whitesell, and Kowalski (1992). More specifically, Griesemer hypothesized that students with high self-efficacy for self-regulated learning before the transition to middle school would increase in their level of motivation after the transition regardless of initial level of motivation, while those students entering middle school with low self-efficacy for self-regulated learning would decrease in their level of motivation after the transition regardless of initial level of motivation.

Griesemer (1995) used two instruments in her study; one to measure intrinsic verses extrinsic motivation and the other to measure self-efficacy for self-regulated learning. Three subscales from Harter's (1980) "A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom" were used to measure motivation: (a) Preference for Challenge versus Preference for Easy Work, (b) Curiosity/Interest versus Please the Teacher/Getting Good Grades, and (c) Independent Mastery versus Dependence on the Teacher. To measure self-efficacy for self-regulated learning the "Self-efficacy for Self-regulated Learning" subscale from Bandura's (unpublished) "Children's Self-efficacy Scale" was used.

The results of Griesemer's (1995) study were inconclusive, with no discernible patterns emerging from the data that would support the original hypothesis. Upon reflection Griesemer came to suspect that one reason for the inconclusive results may be that the two instruments used in her study are measuring aspects of the same constructs. If this were so, then the results she obtained would make sense. That is, if the two instruments do indeed measure aspects of the same constructs then the fact that Griesemer's hypothesis, one that relied on the instruments measuring two different underlying constructs (i.e., self-efficacy and motivation), was not supported could have been anticipated.

The present study is a follow up examination of the data collected during Griesemer's (1995) original study. The purpose of this study is to determine the extent to which Harter's (1980) "A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom" and the "Self-efficacy for Self-regulated Learning" subscale from Bandura's (unpublished) "Children's Self-efficacy Scale" are related, as well as to report basic psychometric information on these scales obtained from the sixth grade sample used by Griesemer.

A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom

Overview. Based on White's model of "effectance motivation" (White, 1959, as cited in Harter, 1980), Harter (1980) constructed the scale around the following question:

> To what degree is a child's motivation for classroom learning determined by his or her intrinsic interest in learning and mastery, curiosity, preference for challenge in contrast to a more extrinsic

> orientation in which the child is motivated to obtain teacher approval and/or grades, and is very dependent on the teacher for guidance? (p. 5)

Using this as a starting point, Harter (1980, 1981) postulated five dimensions that she believed would characterize classroom learning, each of which would have both an intrinsic and extrinsic pole. These five bipolar dimensions, each list in the order of their intrinsic versus extrinsic pole, are: (a) Preference for Challenge versus Preference for Easy Work Assigned, (b) Curiosity/Interest versus Pleasing the Teacher/Getting Grades, (c) Independent Mastery versus Dependence on the Teacher, (d) Independent Judgment versus Reliance on Teacher's Judgment, and (e) Internal Criteria versus External Criteria.[1]

According to Harter (1980), over 3000 pupils were used in various phases of the scale's construction, ranging from grade three through grade six and involving samples from California, Colorado, Connecticut, and New York states. Validity for each item and subsequent subscale was approached from both a face validity and factorial perspective. During the early phases of the instrument's construction item face validity was approached by obtaining verbal elaborations from children concerning their responses to the items "to identify items which were misunderstood or misinterpreted" (p. 7). Factorial analysis was carried out following all subsequent group administrations, with item rewriting, reorganization, and deletion/substitutions. (See below for further details concerning factorial validity.)

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[1] See Harter (1981) for a more complete description of each subscale and their development.

Item Format. Children respond to thirty items – six items per subscale. Each item consists of a description of two sets of children and four possible responses. The child must first decide which children they are most like and then check whether this is "Really True for Me" or only "Sort of True for Me" (see Figure 1).

Figure 1. Example of Item Format (Harter, 1980, p. 6)

Really True for Me	Sort of True for Me				Sort of True for Me	Really True for Me
☐	☐	Some kids know when they've made mistakes without checking with the teacher	BUT	Other kids need to check with the teacher to know if they've made a mistake	☐	☐

Examining Figure 1, it can be seen that this item's response options are arranged from (left to right) indicating high intrinsic orientation to high extrinsic orientation. "With regard to item order, there were two constraints: no two consecutive items are from the same subscale, and no more than two consecutive items are keyed in the same direction" (Harter, 1980, p. 7). Scores for each subscale are obtained by assigning the values 1 to 4 for each item, where 1 indicates a maximal extrinsic orientation and 4 a maximal intrinsic orientation, and then averaging the item scores.

Self-efficacy for Self-regulated Learning

Overview. The instrument used by Griesemer (1995) is an unpublished subscale by noted theorist Albert Bandura. "The scale was developed for middle school students and is being used in a two year longitudinal study in Rome [New

York] generating baseline data that is returning consistently high Cronbach alphas (Albert Bandura, personal communication, May 5, 1994)" (Griesemer, 1995, p. 8). This subscale, Self-efficacy for Self-regulated Learning, is one of nine subscales that comprise Bandura's "Children's Self-efficacy Scale": Self-efficacy in Enlisting Social Resources, Self-efficacy for Academic Achievement, *Self-efficacy for Self-regulated Learning*, Self-efficacy for Leisure Time Skills and Extracurricular Activities, Self-regulatory Efficacy, Self-efficacy to Meet Others' Expectations, Social Self-efficacy, Self-assertive Efficacy, and Self-efficacy for Enlisting Parental and Community Support.[2] Although this scale is unpublished, a recent article by Bandura (1993) makes clear that he views self-efficacy as a multidimensional mechanism.

> Efficacy beliefs influence how people feel, think, motivate themselves, and behave. Self-efficacy beliefs produce these diverse effects through four major processes (A. Bandura, 1992). They include cognitive, motivation, affective, and selection processes. (p. 118)

Item Format. The Self-efficacy for Self-regulated Learning subscale contains 11 items. Each item consists of a stem in the form of a question followed by a seven point Likert scale (see Figure 2). A complete list of the items can be viewed in Appendix A. A subscale score is obtained by summing the individual item scores.

[2] Since this instrument is not currently published or discribed in any currently available articles no further detail is availalbe (e.g., theoretical basis). All inquires should be directed to Albert Bandura.

Figure 2. Example Item Format from Bandura's "Self-efficacy for Self-regulated Learning"

How well can you finish homework assignments by deadlines?

1	2	3	4	5	6	7
Not well at all		Not too well		Pretty well		Very well

Results

Subjects

The data for this study was originally collected during Griesemer (1995). The sample consisted of a sample of 146 sixth grade students enrolled in a suburban New York State school district with five elementary schools feeding into one middle school. The sixth grade is housed in a separate wing of the district's middle school and uses a departmentalized approached: i.e., all students move as a class each period from subject to subject with different teachers for each subject area.

A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom

Reliability. According to Harter (1980, 1981), Kuder-Richardson Formula 20 (KR-20) reliabilities were calculated for each subscale and across samples from California, Colorado, and New York. The range of these of KR-20 reliabilities, by subscale, were: Challenge, .78 to .84; Independent Mastery, .68 to .82; Curiosity, .70 to .78; Judgment, .72 to .81; and Criteria, .75 to .83.

Of interest is that Harter chose to use a form of internal consistency reliability (i.e., KR-20) that requires items to be scored dichotomously (e.g., yes or no, right or wrong) (Anastasi, 1982; Nunnally, 1978), yet no explanation is given as to how these calculations were done with items scored 1 to 4. Therefore, the present authors have

employed coefficient alpha, which is commonly suggested for personality inventories which do not use dichotomous item scoring (see Anastasi, 1982, p. 117).

Below are the alpha reliabilities obtained in the present study, along with those reported by Harter (1980, 1981) (see Table 1). As can be seen, the reliabilities (alpha) obtain are without exception somewhat lower than those reported by Harter. More specifically, while the obtained Challenge and Curiosity subscales reliabilities are close to those reported by Harter, the obtained reliabilities for the Independent Mastery, Criteria, and, especially, the Judgment subscales are considerably lower than expected. Upon further analysis it was determined that item homogeneity, as measured using inter-item correlations, within subscales varied (as one would expect) in relation to the obtained coefficient alpha. For example, within the Challenge subscale all but one of the inter-item correlations were significant at or below $p \leq .001$ while the Judgment subscale had only six of nine possible inter-item correlations significant at or below $p \leq .05$.

Table 1
Subscale Reliabilities of Harter's (1980) "A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom" (n = 146)

Subscale	Alpha Obtained	KR-20 Range Reported by Harter (1980)
Challenge	.76	.78 to .84
Independent Mastery	.53	.68 to .82
Curiosity	.69	.70 to .78
Judgment	.47	.72 to .81
Criteria	.63	.75 to .83

Factorial Validity. According to Harter (1980, 1981), moderate correlations between subscales was anticipated. In fact, Harter (1981) explains that for scale construction purposes oblique factor rotations were used in an acknowledgment of these intercorrelations, although orthogonal rotations revealed the same basic factor structure.[3] However, since Harter does state that both orthogonal and oblique factors solutions should provide similar evidence of factorial validity the present authors chose to use orthogonal procedures.

Table 2 presents the subscale intercorrelations reported in Harter (1981) and those obtained in the present study. To increase the validity of the comparison, only the subscale intercorrelations of Harter's New York sample are presented (Harter also presents a matrix for the California sample).

[3] See pages 303-304 of Harter (1981) for details.

Table 2
Subscale Intercorrelations of Harter's (1980) "A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom"

Harter: New York Sample (n = 761)

Subscale	Challenge	Curiosity	Mastery	Judgment	Criteria
Challenge	–				
Curiosity	.56	–			
Mastery	.61	.39	–		
Judgment	.10	.14	.24	–	
Criteria	.33	.33	.33	.38	–

Rule & Griesemer: Obtained (n = 146)

Subscale	Challenge	Curiosity	Mastery	Judgment	Criteria
Challenge	–				
Curiosity	.56**	–			
Mastery	.55**	.38**	–		
Judgment	.22**	-.03	.28**	–	
Criteria	.38**	.16	.28**	.18	–

** Correlation is significant at $p \leq .01$ level (2 tailed)
Note: Harter (1980, 1981) does not provide significance levels for the correlations.

As can be seen in Table 2, the subscale intercorrelations obtained in the present study, while somewhat lower than those obtained by Harter, do display a similar pattern of magnitude. More specifically, the average subscale intercorrelation from Harter's results is 0.34 (s = .16) compared with 0.30 (s = .18) from the present study; the Pearson correlation between the two sets of subscale intercorrelations is r = .81 ($p \leq .01$ level, 2 tailed). Notable differences in the Table 2 are found when comparing the subscale intercorrelations (Harter vs. Rule & Griesemer) of Judgment versus Challenge, Judgment versus Curiosity, Judgment versus Criteria, and Criteria versus Curiosity.

According to Harter (1981) "higher order factoring revealed that a two-factor solution best described this subscale pattern, with curiosity, challenge, and mastery defining one factor and judgment and criteria defining the other" (p. 306). To confirm this factor structure a principal components factor analysis, with varimax rotation, was done (see Table 3). While not entirely confirmatory, the results of the present analysis lend support to Harter's claim of a two-factor solution and subscale loadings. Using the criteria of selecting the number factors as eigenvalues greater than 1, a two factor solution did emerge using this study's 146 sixth grade subject pool. Additionally, with the exception of the Criteria subscale, all other subscales did load as described by Harter. In the present study the Criteria subscale did not load on the same factor (i.e., the second factor) as the Judgment subscale, although Criteria's loadings across the two factor solution are much less defined than the other subscales.

Self-efficacy for Self-regulated Learning

Reliability. Since this instrument is unpublished and there is little currently available information, the authors present the inter-item correlations (see Table 4). As can be seen in Table 4, there are only four inter-item correlations that are not significant at least at the $p \leq .05$ level (2 tailed). Interestingly, all four of these non-significant correlations involve item number 7: "How well can you organize your school work?". The reader is invited to exam this item in relation to items 4, 5, 8, and 11 (see Appendix A).

Table 3

Factor Analysis of Harter's (1980) "A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom" (n = 146)

Initial Statistics

Factor	Eigenvalue	Percent of Variance	Cum. Percent of Variance
1	2.27	45.4	45.5
2	1.05	20.9	66.3
3	.83	16.6	82.9
4	.51	10.3	93.2
5	.34	6.8	100

Rotated Factor Loading Matrix

Subscale	Factor 1	Factor 2
Challenge	.87	.15
Curiosity	.81	-.31
Mastery	.71	.34
Criteria	.49	.27
Judgment	.10	.92

Notes: Principal Components Analysis, 1 Varimax Rotation

A coefficient alpha was computed for all 11 items: alpha = .81. While it is interesting to note that this reliability is higher than any subscale obtained from Harter's (1980) subscales, the Self-efficacy for Self-regulated Learning subscale is almost twice the length: i.e., 6 versus 11 items respectively.

Factorial Validity. As stated previously, this scale is not yet published. Therefore, Bandura makes no claims concerning the underlying factor structure of the subscale or the instrument as a whole. For the purposes of this paper it was decided to examine the subscale's factor structure in a manner similar to what was done with Harter's (1980) instrument. Therefore, a principal component factor analysis was used. However, since Bandura's instrument is presumed to be a

unitary subscale of a much larger instrument, item scores were used as the basis for analysis rather than subscale scores (as was done with Harter's instrument).

Table 4
Inter-item Correlations from Bandura's "Self-efficacy for Self-regulated Learning" (n = 146)

	SE1	SE10	SE11	SE2	SE3	SE4	SE5	SE6	SE7	SE8	SE9
SE1	---										
SE10	.43**	---									
SE11	.23**	.17*	---								
SE2	.44**	.47**	.33**	---							
SE3	.39**	.49**	.21**	.32**	---						
SE4	.21**	.32**	.21**	.40**	.25**	---					
SE5	.39**	.21**	.28**	.29**	.29**	.17*	---				
SE6	.53**	.47**	.18**	.59**	.38**	.27**	.29**	---			
SE7	.44**	.21**	.10	.17*	.21**	.13	.00	.29**	---		
SE8	.34**	.44**	.17*	.29**	.22**	.29**	.14*	.34**	.11	---	
SE9	.38**	.35**	.21**	.22**	.34**	.15*	.17*	.31**	.24**	.14*	---

* Correlation is significant at $p \leq .05$ level (2 tailed)
** Correlation is significant at $p \leq .01$ level (2 tailed)

Notes: Items are identified by SE (Self-efficacy) and item number (e.g., 1). So, "SE1" means "Self-efficacy Item 1". See Appendix A for actual items. Item presentation order is an artifact of the analysis program used for this study (SPSS Version 7.0 for Windows '95).

Interestingly, the "Self-efficacy for Self-regulated Learning" subscale has a factor structure where, although three-factors emerged using eigenvalues greater than 1 (see Table 5), a two-factor may be defensible using other criteria (e.g., scree plot). Given the number of items that display significant cross loadings (e.g., 2, 3, 6, 10), a re-analysis with the factor solution restricted to $m = 2$ might yield more theoretically interesting and statistically more parsimonious results. However, since the purpose of the present paper is not to develop a theoretical foundation for the scale it was decided to end analysis at this point.

Table 5
Factor Analysis of Bandura's "Self-efficacy for Self-regulated Learning" (n = 146)

Initial Statistics

Factor	Eigenvalue	Percent of Variance	Cum. Percent of Variance
1	3.98	36.1	36.1
2	1.15	10.4	46.6
3	1.03	9.4	55.9
4	.87	7.9	63.9
5	.84	7.4	71.2
6	.74	6.7	78.0
7	.68	6.1	84.0
8	.63	5.7	89.7
9	.43	3.9	93.6
10	.38	3.5	97.1
11	.32	2.9	100

Rotated Factor Loading Matrix

Item #	Factor 1	Factor 2	Factor 3
8	.74	.09	-.05
4	.68	-.03	.17
10	.65	.41	.10
2	.63	.23	.37
6	.54	.49	.21
7	.04	.77	-.18
1	.33	.70	.23
9	.04	.35	.25
3	.32	.47	.33
5	.11	.11	.78
11	.12	.09	.70

Notes: Principal Components Analysis, 1 Varimax Rotation

Interrelationship of the Scales

Following the preceding preliminary analysis, that of providing psychometric information of each scale independently, an analysis designed to directly address

the question of scale interrelationship was undertaken. That is, does the Harter (1980) "A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom" and Bandura's subscale "Self-efficacy for Self-regulated Learning" measure the same constructs? As a first step, all items from each the five subscales of Harter's (1980) instrument and the subscale of Bandura's were summed to produce subscale scores. These six subscales were then intercorrelated (see Table 6).

Table 6
Subscale Intercorrelations of Harter's (1980) "A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom" and Bandura's "Self-efficacy of Self-regulated Learning" Subscale (n = 146)

Subscale	Challenge	Curiosity	Mastery	Judgment	Criteria	Self-reg.
Challenge	—					
Curiosity	.56**	—				
Mastery	.55**	.38**	—			
Judgment	.22**	-.03	.28**	—		
Criteria	.38**	.16	.28**	.18	—	
Self-reg.	.36**	.33**	.25**	-.02	.24**	—

** Correlation is significant at $p \leq .01$ level (2 tailed)

Since the majority of Table 6 is a reproduction of Table 2 (i.e., the observed Harter subscale intercorrelations) the row of most interest in Table 6 is the bottom; the row adding Self-efficacy for Self-regulated Learning (Self-reg.). Note that Self-reg. correlates significantly with all of the Harter subscales with the exception of Judgment.

Following the examination of the subscale intercorrelations a principal component factor analysis was performed using all six subscales. To facilitate the exploratory nature of this analysis no restriction was placed upon the number of

factors to be used in the final solution (see Table 7). Examination of Table 7 reveals that a two-factor solution was selected for the final solution. This is of particular interest in that a two-factor solution was both report by Harter (1981) for her five subscales and confirmed in the present analysis (see Table 3), and the addition of Bandura's "Self-efficacy of Self-regulated Learning" (Self-reg.) to the original covariance matrix did not change the number of factors. Note that Bandura's Self-reg. loaded clearly on the first factor, along with Harter's Curiosity, Challenge, and Criteria subscales, while Harter's Judgment and Mastery subscales load most heavily on the second factor. However, while the addition of Self-reg. to the covariance matrix did not alter the number of factors in the final solution, it did cause a shift in factor loadings for Harter's subscales —particularly for the Mastery subscale. Prior to the addition of Self-reg., Harter's Mastery subscale loaded as she reported: i.e., on the first factor with Challenge and Curiosity. However, with the addition of Bandura's Self-reg. subscale, Mastery

now is most heavily loaded on the second factor, although a large crossing still exists on the first factor. Also of interest, though not unexpected given the results of Table 3, is that Harter's Criteria subscale is still loading on the first factor with Challenge and Curiosity, rather than with Judgment, as reported by Harter (1981).

Table 7

Factor Analysis of Harter's (1980) "A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom" and Bandura's "Self-efficacy of Self-regulated Learning" Subscale (n = 146)

Initial Statistics

Factor	Eigenvalue	Percent of Variance	Cum. Percent of Variance
1	2.49	41.6	41.6
2	1.22	18.7	60.3
3	.84	14.1	74.4
4	.69	11.4	85.8
5	.51	8.5	94.3
6	.34	5.7	100

Rotated Factor Loading Matrix

Subscale	Factor 1	Factor 2
Curiosity	.79	-.01
Challenge	.75	.42
Self-reg.	.70	-.10
Criteria	.43	.35
Judgment	-.15	.89
Mastery	.54	.60

Notes: Principal Components Analysis, 1 Varimax Rotation

Discussion

The purpose of this study was to determined the extent to which Harter's (1980) "A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom" and the "Self-efficacy for Self-regulated Learning" subscale from Bandura's "Children's Self-efficacy Scale" are related, as well as to report basic psychometric information on these scales obtained from the sixth grade sample used by Griesemer (1995). The results of this study confirm the suspicions of Griesemer: the scales are indeed measuring aspects of the same underlying constructs. While none of the intercorrelations between Bandura's "Self-efficacy for Self-regulated Learning" and

Harter's five subscales was larger than $r = .36$, all but one was significant at the $p \leq .01$ level (2 tailed). Additionally, a factor analysis of the Bandura's subscale revealed, like Harter's five subscales, a defensible two-factor solution. More importantly, however, was that when all six subscales were factor analyzed together Bandura's subscale did not significantly disrupt the factor structure and loadings of Harter's subscales, and loaded heavily on the same factor as two of the three Harter subscales used in Griesemer (1995): i.e., Challenge and Curiosity. Also, the third Harter subscale used by Griesemer, Mastery, had significant cross loadings on the factor that Bandura's subscale loaded most on.

Given the above, it would appear the inconclusive results reported in Griesemer's study could well have been the result of a lack of differentiation in the two instruments used. The present study's results would seem to add to Harter's (1981) supposition that "perceived competence in a particular domain should be related to one's motivational orientation (i.e., the higher one's perceived competence, the more intrinsic one's orientation)" (p. 308). In Harter et al. (1992) the connection is again broached: "Children losing confidence in their competence would be expected to feel worse about their scholastic experience, and this negative affect might result in further deterioration of perceived competence. These findings are consistent with our model of the relationships among perception of competence, affect, and motivation ..." (p. 802).

Perhaps both Bandura and Harter et al. are approaching a common issue, the connection between classroom self-efficacy and learning self-regulation from

differing perspectives: Bandura via a cognitive theoretical perspective and Harter et al. via examination of classroom environments. The present study's findings of a high degree of communality between each author's scales would seem to support this contention.

In conclusion, given the apparent overlapping of scale properties, future researcher are advised to be cautious in their choice of instruments. That is, although the instruments used to measure motivation, self-efficacy, and self-regulation may appear to be measuring differing constructs the interrelatedness of these constructs, and resultant instruments may cause research results to be inconclusive, confusing, or otherwise uninterpretable. This caution may be particularly important since programmatic researchers in this realm are calling for further examination into the causal nature of the these relationships (e.g., Harter et al., 1992). It is the present authors opinion that a parallel effort be exerted in the examination and construction of measures that will facilitate effective research efforts in these realms.

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Appendix A

Bandura's Self-efficacy for Self-regulated Learning

1. How well can you finish homework assignments by deadlines?

2. How well can you study when there are other interesting things to do?

3. How well can you concentrate on school subjects?

4. How well can you take notes during class instruction?

5. How well can you use the library to get information for class assignments?

6. How well can you plan your school work?

7. How well can you organize your school work?

8. How well can you remember information presented in class and textbooks?

9. How well can you arrange a place to study without distractions?

10. How well can you motivate yourself to do school work?

11. How well can you participate in class discussions?

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